

# An underground pump station – fit for a king

Using optimized solutions from Xylem

Just five meters underground, at what was once the site of a 17th century palace, is Stockholm's largest pumpstation at Karl XII Square in the King's Gardens. In October 1994, Stockholm Water Company launched a major renovation and expansion of the facility to increase safety and capacity. To this end they installed four Flygt submersible pumps, thus equipping the station for duty well into the next millennium.

## The background

Stockholm is often described as the "Venice of the North" – a fitting title for Sweden's beautiful capital city. But unlike Venice Stockholm's reputation for clean water is worldrenowned. Water that is both clean enough to swim in and clean enough to fish in. By 1994 the Karl XII station's ageing pipes and three De Laval cast iron pumps were nearly 60 years old. A breakdown at the station would constitute a very serious environmental hazard. The prospect of untreated sewage flowing out into the waters of central Stockholm would be disastrous for a city that had staked its reputation on the purity of its water.

## The solution

Having considered a number of alternatives for the renovation of the station the Stockholm Water Company – the city's wastewater treatment and water supply company – decided to replace the old pumps with four new Flygt CZ 3501 pumps, thus creating two stations in one.

Originally fitted with one pressure pipe, a new pipe was connected at the station to increase safety and the old pipe was relined. The four Flygt pumps, designed for optimum functionality, were grouped in such a way that each pair had its own pressure pipe connection. This, in effect, created two separate systems capable of operating independently of each other or in several combinations.

The most unusual aspect about this solution also happens to be the feature the client found most attractive about it. Unlike most pumps of this size, the Flygt pumps could be installed horizontally instead of vertically. A crucial point in view of the fact that the station has a very low ceiling. The pumps are assembled in a 'gun cradle' and can simply be dismantled and 'rolled out' for service and inspection.



The building site with Stockholm's Royal Castle in the background.

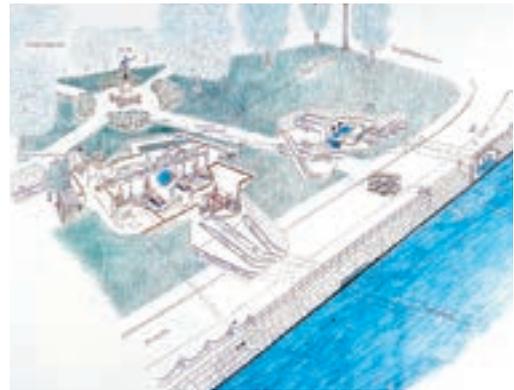


It isn't every day Flygt pumps get painted red. That's what the architect stipulated when the Karl XII pumping station in Stockholm was built.

## The benefits

The entire station is run by a computerised control system from Stockholm Water's head office. In the 1930s workers had to be stationed in the pump rooms, around the clock, to make sure everything ran smoothly. The pumps is monitored by Flygt Monitoring And Status unit called Flygt MAS711, with in-built web server. Flygt MAS711 logs all necessary pump data and makes trouble shooting much easier and less time consuming than ever before. That saves time, cost and secure maximum up-time of the pumps. Around 25% of Stockholm's sewage is pumped from the Karl XII station. As a result of the retrofit the station's maximum capacity went from 2,200 to 3,500 litres a second - that's 60% more capacity.

A collaborative project between Stockholm Water's technicians and Xylem, the Karl XII pump station was remodelled and adapted to meet today's increasing demands for a more flexible working environment and greater ease of serviceability. And because there was no need to pull the station down and rebuild from the ground up construction costs were reduced substantially. In retrofitting the station Xylem fulfilled two further objectives central to the facility's upgrade. First, the new and improved station in no way obscures or spoils the view of either the Royal Palace, just opposite, or the King's Gardens. And second, it provides for the effective pumping of wastewater in the inner city, thereby safeguarding Stockholm's reputation for clean water.



The Karl XII pumping station in the heart of Stockholm utilizes Xylem technology to safeguard the Swedish capital's well-deserved reputation for clean water.

## Technical specifications

Pumps: ..... 4 x Flygt CZ 3501  
Power: ..... 150 kW  
Application: ..... Pump station  
Weight: ..... 4 x 4 ton  
Capacity: ..... 1,100 l/s  
Pump monitoring unit: ... 4 x Monitoring And Status (MAS)

